

CLAIMS

What is claimed is:

1. A data storage apparatus, comprising:
 - a magnetic disk that magnetically records data;
 - a buffer memory that temporarily retains data read from and written on the magnetic disk prior to a process on the magnetic disk; and wherein
 - the buffer memory includes a memory area divided into a first ring buffer that stores a write request to the magnetic disk accepted from outside, and a second ring buffer that stores data read from the magnetic disk, and said first ring buffer and said second ring buffer have respective buffer sizes that are varied by changing a position of a partition for separating the first ring buffer from the second ring buffer.
2. The data storage apparatus of claim 1, wherein the partition is a bottom page of the first ring buffer or a bottom page of the second ring buffer.
3. The data storage apparatus of claim 1, wherein the partition of the buffer memory is shifted according to external access patterns to the magnetic disk.

4. A data storage apparatus, comprising:

a recording medium that records data;

buffer means having a first ring buffer that temporarily retains an external write request to the recording medium prior to a process on the recording medium, and a second ring buffer that retains data read from the recording medium according to an external read request to the recording medium; and

buffer control means that changes respective buffer sizes of the first ring buffer and the second ring buffer included in the buffer means according to external access patterns to the recording medium.

5. The data storage apparatus of claim 4, wherein the buffer means is a RAM in which a buffer area is divided into the first ring buffer and the second ring buffer.

6. The data storage apparatus of claim 4, wherein the buffer control means changes a position of a bottom page of the first ring buffer or the second ring buffer, which bottom page divides the buffer area of the RAM, to thereby change the respective buffer sizes of the first ring buffer and the second ring buffer.

7. The data storage apparatus of claim 4, wherein the buffer control means changes the respective buffer sizes of the first and second ring buffers, based on the type of each access request accepted from outside and frequency of the access requests for each type.

8. The data storage apparatus of claim 4, wherein the buffer control means changes the respective buffer sizes of the first and second ring buffers, based on the size of write data or read data related to an access request accepted from outside.

9. A method of managing a buffer memory that temporarily retains data prior to a process to a predetermined recording medium when the data is read from or written in the predetermined recording medium, the method comprising:

analyzing an external access request to the recording medium;

determining based on said result of analysis whether respective buffer sizes of a write request ring buffer and a read data ring buffer provided in a buffer area of the buffer memory should be changed; and

changing a position of a partition for dividing the buffer area of the buffer memory into the two ring buffers according to said determination to thereby change the respective buffer sizes of the two ring buffers.

10. The method of claim 9, wherein said step for analyzing the access request analyzes the type of the access request and frequency of the access requests for each type; and

said step for determining whether the buffer sizes should be changed, judges that the buffer sizes are changed in such a manner that the write request ring buffer is expanded when the number of write requests increases in the external access request, and judges that the buffer sizes are changed in such a manner that the read data ring buffer is expanded when the number of read requests increases in the external access request.

11. The method of claim 9, wherein said step for analyzing the access request analyzes the size of write data or read data related to the access request; and

said step for determining whether the buffer sizes should be changed, judges that the buffer sizes are changed in such a manner that the write request ring buffer is expanded when the number of access requests for writing large size data increases in the access request, and judges that the buffer sizes are changed in such a manner that the read data ring buffer is expanded when the number of access requests for reading large size data increases in the external access request.

12. The method of claim 9, wherein said step for changing the buffer sizes changes a position of a bottom page of the write request ring buffer or the read data ring buffer to thereby change the buffer sizes of the two ring buffers.

13. A hard disk recorder for recording and reproducing a multimedia content by use of a magnetic disk as a recording medium, comprising:

buffer means having a first ring buffer that temporarily retains a write request to the magnetic disk prior to a process on the magnetic disk, and a second ring buffer that retains data read from the magnetic disk according to a read request to the magnetic disk; and

buffer control means that dynamically allocates a memory area of the buffer means in such a manner as to give a large buffer size to the first ring buffer when the hard disk recorder is operating in an operation mode for recording the multimedia content and to give a large buffer size to the second ring buffer when the hard disk recorder is operating in an operation mode for reproducing the multimedia content.